operating a selected number of said sensors on a substantially concurrent basis to spectrophotometrically irradiate at least two separate internal regions of the test subject during a common time interval, each such region being associated with a different such testing site;

separately detecting and receiving the light energy resulting from said spectrophotometric irradiation for each of said at least two different regions, and conveying separate sets of signals to said control and processing station which correspond to the separately detected light energy from said at least two different regions;

separately and concurrently analyzing said conveyed signals to separately determine quantified data representative of and evaluating the same selected blood metabolite in each of said at least two internal regions; and

concurrently visually displaying said separately determined quantified data for each of said at least two different regions for direct concurrent mutual comparison.

2. (Amended) The method of claim 1, wherein said step of analyzing comprises quantitative determination of blood oxygenation level within each of said at least two regions.

9. (Amended) The method of claim 1, wherein said sensors are applied to the head of the test subject and used to monitor mutually separate regions within the brain.

11. (Amended) The method of claim 9, wherein said sensors are positioned in locations proximate to different brain hemispheres and said two mutually separate internal regions are each located in a different such brain hemisphere.

17. (Amended) Apparatus for concurrent comparative spectrophotometric in vivo monitoring of selected blood metabolites present in each of a plurality of different internal regions on a continuing basis, comprising:

a plurality of spectrophotometric sensors, each attachable to a test subject at a different test location and adapted to separately but concurrently spectrophotometrically irradiate a different region within the test subject associated with each such test location;

a controller and processor, and circuitry coupling each such sensor to said controller and processor for separately and individually but concurrently operating certain of said sensors to spectrophotometrically irradiate each of said different internal region within the test subject associated with each such test location;

said sensors each further adapted to receive light energy resulting from the separate spectrophotometric irradiation by that sensor of its associated different region on a substantially concurrent basis with other such sensors, and to produce separate signals corresponding to the light energy so received; and said circuitry acting to convey said separate signals to said controller and processor for separate analytic processing;

said controller and processor adapted to analytically process said conveyed signals separately and thereby determine separate quantified blood metabolite data therefrom for separate such sensors and different associated regions; and

a visual display coupled to said controller and processor and adapted to separately but concurrently display the quantified metabolite data so determined for each of a plurality of sensors in a mutually-comparative manner.

18. (Amended) The apparatus of claim 17, wherein said controller and processor is adapted to analyze said data to quantitatively determine blood oxygenation within at least two separate internal regions.

19. (Amended) The apparatus of claim 18, wherein said controller and processor is adapted to produce separate numeric value designations for hemoglobin oxygen saturation for at least two of said different regions.

27. (Amended) The apparatus of claim 25, wherein at least two of said sensors are adapted to be positioned in locations associated with mutually different hemispheres of the same brain and each such sensor is operable to separately monitor at least portions of each such different hemisphere.

28. (Amended) The apparatus of claim 27, wherein said controller and processor is adapted to determine cerebral blood oxygenation saturation within each of said two different brain hemispheres.

29. (Amended) The apparatus of claim 27, wherein said sensors are adapted to provide signals to said controller and processor which comprise at least two data sets that cooperatively define at least portions of a particular area within the same hemisphere of said brain.

30. (Amended) The apparatus of claim 24, wherein said data sets provided by said sensors include one such set characterizing a first part of said particular hemisphere area and another such set characterizing a second part of said particular hemisphere area.

31. (Amended) The apparatus of claim 30, wherein said second part of said particular hemisphere area characterized by said other such data set includes at least part of said first part of said hemisphere area.

33. (Amended) A method for concurrent comparative in vivo monitoring of blood metabolites in each of a plurality of different internal regions in a selected test subject, comprising the steps of:

spectrophotometrically irradiating each of a plurality of different testing sites on said test subject;

detecting light energy resulting from said spectrophotometric irradiation for a plurality of such testing sites, and providing separate sets of signals to a control and processing station which are representative of the light energy so received for each of said plurality of testing sites and which cooperatively define blood metabolite data for an individual one of said defined regions;

analyzing said conveyed signals to determine quantified blood metabolite data representative of at least one defined region within said at least one test subject associated with each of at least two different such testing sites, each such defined region being different from the other; and

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concurrently displaying said data for each of said at least two different regions at substantially the same time for direct mutual comparison.

Sub B8

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35. (Amended) The method of claim 33, wherein said provided data sets include one such set which characterizes a first zone within said defined region and another such set which characterizes a second zone that is at least partially within said defined region.

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40. (Amended) The method of claim 33, wherein said spectrophotometric irradiation comprises application of at least two different wavelengths and such wavelengths are applied in an alternating sequence of timed pulses, detection of the resulting light energy corresponding to each of said wavelengths is done on a timed periodic basis using periods whose occurrence generally corresponds to that of said applied spectrophotometric wavelength pulses.

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42. (Amended) The method of claim 40, wherein the duration of each of said timed detection periods is limited to a length which is less than that of each pulse of applied spectrophotometric irradiation energy.

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48. (Amended) Apparatus for spectrophotometric in vivo monitoring of a selected metabolic condition in each of a plurality of different test subject regions on a substantially concurrent basis, comprising:

a plurality of spectrophotometric emitters, each adapted to separately spectrophotometrically irradiate a designated region within a test subject from a test location on such test subject;

a controller and processor, and circuitry coupling each such emitter to said controller and processor for individually operating selected such emitters to spectrophotometrically irradiate at least two particular regions within a test subject from at least one selected test location;

a plurality of detectors, each adapted to separately receive light energy resulting from the spectrophotometric irradiation of said at least two particular regions, and to produce at least one

separate set of corresponding signals for each such region; and circuitry acting to convey said separate sets of signals to said controller and processor for analytic processing;

said controller and processor adapted to analytically process said conveyed sets of signals to determine separate sets of quantified data representative of said metabolic condition in said at least two regions; and

a visual display coupled to said controller and processor and adapted to display separate representations of said separate sets of quantified metabolic data for each of said at least two regions in a mutually-comparative manner and on a substantially concurrent basis.

49. (Amended) The apparatus of claim 48, wherein said controller and processor includes a computer programmed to analyze said detector signals to separately determine the blood oxygenation state within each of said at least two regions.

59. (Amended) The apparatus of claim 57, wherein at least certain of said operational emitter and detector pairs include at least two detectors, and wherein at least one detector of such a pair is located nearer the emitter of such pair than at least one of the other detectors to thereby provide near and far detector groupings for that operational pair of emitter and detectors.

ABSTRACT OF THE DISCLOSURE:

Please enter the attached ABSTRACT OF DISCLOSURE provided on a separate sheet in to the record of this application.